DIMETHYL CARBAMOYL CHLORIDE

Dimethyl carbamoyl chloride is a federal hazardous air pollutant and was identified as a toxic air contaminant in April 1993 under AB 2728.

CAS Registry Number: 79-44-7 $(CH_3)_2NC(O)Cl$

Molecular Formula: C_3H_6ClNO

Dimethyl carbamoyl chloride is a colorless liquid. It rapidly hydrolyzes in water to dimethylamine, carbon dioxide, and hydrogen chloride. Dimethyl carbamoyl chloride will react with water or steam to produce toxic and corrosive fumes. When heated to decomposition, it emits toxic fumes of hydrochloric acid and other chlorinated compounds as well as nitrogen oxides (NTP, 1991).

Physical Properties of Dimethyl Carbamoyl Chloride

Synonyms:	dimethyl carbamyl chloride; carbamic chloride; dimethylcarbamic chloride; dimethyl; chloroformic acid dimethlamide; n,n-dimethylcarbamoyl chloride
Molecular Weight:	107.6
Boiling Point:	165 °C
Melting Point:	-33 °C
Vapor Density:	3.73 (air = 1)
Density/Specific Gravity:	1.168 at 20/4 °C (water = 1)
Conversion Factor:	1 ppm = 4.4 mg/m^3

(HSDB, 1991; Sax, 1987; U.S. EPA, 1994a)

SOURCES AND EMISSIONS

A. Sources

Dimethyl carbamoyl chloride is used as a chemical intermediate in the production of dyes, pharmaceuticals, and pesticides (U.S. EPA, 1994a).

B. Emissions

No emissions of dimethyl carbamoyl chloride from stationary sources in California were reported, based on data obtained from the Air Toxics “Hot Spots” Program (AB 2588) (ARB, 1997b).

C. Natural Occurrence

No information about the natural occurrence of dimethyl carbamoyl chloride was found in the readily-available literature.

AMBIENT CONCENTRATIONS

No Air Resources Board data exist for ambient measurements of dimethyl carbamoyl chloride.

INDOOR SOURCES AND CONCENTRATIONS

No information about the indoor sources and concentrations of dimethyl carbamoyl chloride was found in the readily-available literature.

ATMOSPHERIC PERSISTENCE

No information about the atmospheric persistence, half-life, and lifetime of dimethyl carbamoyl chloride was found in the readily-available literature.

AB 2588 RISK ASSESSMENT INFORMATION

Dimethyl carbamoyl chloride emissions are not reported from stationary sources in California under the AB 2588 program. It is also not listed in the California Air Pollution Control Officers Association Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines as having health values (cancer or non-cancer) for use in risk assessments (CAPCOA, 1993).

HEALTH EFFECTS

Probable routes of human exposure to dimethyl carbamoyl chloride are inhalation and dermal contact.

Non-Cancer: Dimethyl carbamoyl chloride is rapidly hydrolyzed by moisture to dimethylamine, carbon dioxide, and hydrochloric acid, and therefore, expected to be extremely irritating by inhalation or direct contact. One worker suffered eye irritation and liver effects following occupational exposure to dimethyl carbamoyl chloride. In rats, acute overexposure to dimethyl carbamoyl chloride has been observed to cause respiratory tract irritation and breathing difficulty. No information is available on the chronic effects of dimethyl carbamoyl chloride in humans (U.S. EPA, 1994a).

The United States Environmental Protection Agency (U.S. EPA) has the Reference Concentration (RfC) under review, and has not set an oral Reference Dose (RfD) (U.S. EPA, 1994a).

No information is available on the developmental or reproductive effects of dimethyl carbamoyl chloride in humans or animals (U.S. EPA, 1994a).

Cancer: No increased incidence of lung cancer cases was observed among dimethyl carbamoyl chloride production workers. Nasal tract carcinomas have been observed in rats and male hamsters following inhalation exposure. Skin tumors were observed in dermally exposed mice. The U.S. EPA has classified dimethyl carbamoyl chloride in Group B2: Probable human carcinogen (U.S. EPA, 1994a). The International Agency for Research on Cancer has classified dimethyl carbamoyl chloride in Group 2A: Probable human carcinogen (IARC, 1987a).

The State of California has determined under Proposition 65 that dimethyl carbamoyl chloride is a carcinogen (CCR, 1996). The inhalation potency factor that has been used as a basis for regulatory action in California is 3.7×10^{-3} (microgram per cubic meter)$^{-1}$ (OEHHA, 1994). In other words, the potential excess cancer risk for a person exposed over a lifetime to 1 microgram per cubic meter of dimethyl carbamoyl chloride is estimated to be no greater than 3,700 in 1 million. The oral potency factor that has been used as a basis for regulatory action in California is 13.0 (milligram per kilogram per day)$^{-1}$ (OEHHA, 1994).